DOCUMENT RESUME

ED 379 216 SP 035 702

AUTHOR Ross, John A.
TITLE Beliefs That Make a Difference: The Origins and Impacts of Teacher Efficacy.
PUB DATE Jun 94
NOTE 45p.; Paper presented at the Annual Meeting of the Canadian Association for Curriculum Studies (Calgary, Alberta, Canada, June 1994).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Elementary Secondary Education; Institutional Characteristics; *Outcomes of Education; Research Needs; Research Problems; Self Concept; *Self Efficacy; *Teacher Characteristics; *Teacher Effectiveness

ABSTRACT

After analysis of 88 studies of the antecedents and consequences of teacher efficacy, it was found that personal attributes and organizational characteristics were associated with higher teacher efficacy. There was consistent evidence that teacher efficacy influences teacher and student outcomes. Higher efficacy was associated with: being female, the teacher's attribution of student success and failure to forces within their control, elementary level teaching rather than middle and high school teaching, students who are relatively orderly and of higher ability, schools characterized by low stress, leadership responsive to teacher needs, the use of teaching techniques which are more challenging and difficult, teachers' willingness to implement innovative programs, developmental classroom management practices, and enhanced student mastery of cognitive and affective goals. Deficiencies of past research include inattention to within-individual differences and a failure to conduct rigorous intervention studies. It is proposed that future research focus on the use of teacher efficacy as a construct in school improvement research. (Contains 113 references.) (Author/JDD)

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ED 379 216

# BELIEFS THAT MAKE A DIFFERENCE:

# THE ORIGINS AND IMPACTS OF TEACHER EFFICACY

John A. Ross

Ontario Institute for Studies in Education

Trent Valley Centre

Box 719, 150 O'Carroll Avenue

Peterborough, Ontario, K9J 7A1

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Paper presented at the annual meeting of the Canadian Association for Curriculum Studies

Calgary, June 1994

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**Abstract**

A search identified 88 studies of the antecedents and consequences of teacher efficacy. Personal attributes (such as being female, internally controlled and relatively inexperienced in the profession), and organizational characteristics (such as being in schools with low stress, a collaborative culture and leadership responsive to teacher needs) were associated with higher teacher efficacy. There was consistent evidence that teacher efficacy influences teacher and student outcomes. Higher efficacy was associated with the use of teaching techniques which are more challenging and difficult, with teachers' willingness to implement innovative programs, with developmental classroom management practices and enhanced student mastery of cognitive and affective goals. Deficiencies of past research include inattention to within-individual differences and a failure to conduct rigorous intervention studies. It is proposed that future research focus on the use of teacher efficacy as a construct in school improvement research.

# BELIEFS THAT MAKE A DIFFERENCE: THE ORIGINS AND IMPACTS OF TEACHER EFFICACY

In 1989 Susan Rosenholtz described research on teacher efficacy as being in its "infancy" (Rosenholtz, 1989: 105). In the few short years since then our understanding of the origins and outcomes of teachers' beliefs about their effectiveness has grown substantially. The purpose of this article is to review past research: to distinguish the antecedent conditions associated with the waxing and waning of teacher efficacy; to identify the consequences of perceived efficacy on teacher practice and on student achievement; to recognize deficiencies in the corpus of the research, and to suggest directions for further inquiry.

## Origin of the Construct

Teacher efficacy measures the extent to which teachers believe their efforts will have a positive effect on student achievement. Although the construct emerged from a variety of sources (reviewed by Denham & Michael, 1981; Rees, 1986), two theories made the greatest contribution. The earliest formulations of teacher efficacy were based on Rotter's (1966) locus of control theory. Rotter proposed that there was a generalized expectancy for the control of reinforcements based on attributions of successes and failures to subjects' own efforts (internal control) or to efforts beyond their command (external control). Weiner et al. (1971) expanded this set to four attribution categories. The Rand studies in the mid-1970's drew directly upon Rotter's ideas to develop a single efficacy instrument based on an item addressing internal control and a second focused on external control. Some teacher efficacy researchers, most notably Thomas Guskey, continue to work within a locus of control framework, equating teacher efficacy with a willingness to take responsibility for student successes and failures.

The majority of teacher efficacy researchers derive their conceptions from Bandura's (1977) theory of self-efficacy, defined as individuals' judgments of their ability to complete future actions. These judgments are based on personalistic interpretations of past actions rather than on some extra-individual criterion of performance. Over time these interpretations stabilize as persistent, but not static, performance expectations. These anticipations can be modified by sources of new information (Bandura, 1986). Interpretations of the outcomes of further performance are the most important knowledge source. Vicarious experience (e.g., observation of the success or failure of peers) can also have an influence. Lesser impacts on self-efficacy expectations are derived from verbal persuasion (e.g., attempts by peers or supervisors to convince subjects that they are competent to perform the target actions), and physiological responses (e.g., physical symptoms communicating an inability to perform effectively).

In Bandura's (1993) theory, self-efficacy is a regulatory mechanism that influences behavior through four processes: The first, cognitive processes, consists of higher self-efficacy contributing to the adoption of higher goals, increased goal commitment, and the expectation that

goals will be achieved despite setbacks along the way. These processes suggest that teachers with higher perceived efficacy will set higher goals for themselves and their students, will work harder to achieve these goals, and will persist despite environmental obstacles and initial failure.

The second, motivational processes, links self-efficacy to attribution theory (higher efficacy subjects are likely to ascribe failures to insufficient effort than to low ability), outcome expectancies (the belief that the actions that can be performed will have the desired effects), and to cognized goals (subjects are motivated by present goals rather than by unrealized future states). These processes suggest that teachers with high efficacy expectations will be more willing to accept responsibility for student outcomes rather than ascribing student achievement differences to factors beyond their control. They will be more likely to believe that there are specific teaching strategies that lead to student learning. They will focus on short term goals which are attainable.

The third, affective processes, refers to coping strategies that enable people to resist the negative effects of stress by turning off negative thoughts that lower performance. These processes suggest that teachers who expect they will be successful will be more resilient in dealing with day-to-day pressures, will utilize stress-reducing mechanisms to enhance their performance, and will be more satisfied with their profession.

In the fourth, selection processes, self-efficacy shapes lives by influencing the selection of activities and environments. These processes suggest that teachers with high perceived efficacy will manifest higher commitment to teaching and will more frequently engage in normative activities. It may also influence the subjects and grades they choose to teach.

Following Bandura, most researchers have contrasted two types of teacher efficacy: Personal teaching efficacy is the respondent's expectation that he or she will be able to bring about student learning; general teaching efficacy is the belief that the teacher population's ability to bring about change is limited by factors beyond their control. The first is much closer to Bandura's self-efficacy, representing the belief that the individual will be able to perform the actions that lead to student learning. The second is more like outcome expectancy: the belief that certain actions will lead to learning.

**Measurement**

Teacher efficacy has been measured with self-administered questionnaire items, usually in Likert format. Three instruments have been frequently administered. The Rand studies (Armor et al., 1976; Berman, McLaughlin, Bass, Pauly & Zellman, 1977) developed single items for personal ("If I try really hard I can get through to even the most difficult or unmotivated students") and general teaching efficacy ("When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment"). These items were derived primarily from Rotter's (1966) locus of control theory.

Some researchers (Guskey, 1988; Rose & Medway, 1981; Vitali, 1993) have developed more extensive instruments from this set based on teachers' willingness to take responsibility for student successes and failures. Although the Rand items have been described as crude (Guskey & Passaro, 1993), they predict scores on lengthier instruments and continue to be used. But since the items correlate poorly with one another, current users tend to treat them as separate indicators rather than as a single scale.

Gibson & Dembo (1984) developed a 30-item set from Bandura's theory. Factor analysis was used to select a nine item personal and a seven item general teaching efficacy scale. The validity of the scales was established through a multi-trait multi-method triangulation. Although the Gibson & Dembo instruments have good psychometric properties and the assignments of items to scales has been confirmed in numerous factor analyses with different samples, some concern has been expressed. For example, these items overlap with locus of control, confuse efficacy with outcome expectancy, are susceptible to response bias (particularly in the general teaching efficacy scale which contains only a single negatively worded item), and are too general to meet Bandura's definition of self-efficacy as a situation specific construct.

Riggs and Enochs (1990) attempted to resolve the difficulties of the Gibson & Dembo instruments by creating a 25-item elementary school science efficacy scale. They also developed a parallel version for preservice teachers. Riggs and Enochs' measure has been used by several science researchers (with elementary and secondary teacher samples) and has been adapted to specific science subjects, such as chemistry (Rubeck & Enochs, 1991).

In addition to these core instruments, other measures, often unique to a single study, have been used. In virtually all of these, teachers rate themselves on an absolute scale, even though there is evidence (Ashton, Buhr, & Crocker, 1984) that scores are less distorted by social desirability when teachers rate themselves in comparison to other teachers.

**Search Procedures**

A computer search of research data banks (Resources in Education, Current Index to Journals in Education, Ontario Educational Research Information Service and Dissertation Abstracts) for 1975-1993, together with a survey of papers presented at the annual conferences of the American Educational Research Association and Canadian Society for the Study of Education 1987-1993, was used to identify studies of teacher efficacy. The search, and subsequent manual branching, identified 88 suitable studies. To be included in the review the studies had to meet two criteria. First, the study had to provide an empirical measure of teacher's beliefs about their ability to bring about learning in their own classrooms and/or their beliefs in the capacity of schools to overcome out-of-school impediments to learning. Excluded by this criterion were reflective articles which reviewed the construct without providing fresh data sets. Second, the study had to identify antecedent conditions associated with teacher efficacy or its consequences

for teachers or students. Excluded by this criterion were reports that dealt exclusively with instrument construction. The search procedures had the effect of under-selecting qualitative studies, largely because the efficacy elements were usually a small part of studies that were primarily focussed on other issues (e.g., Richardson, Casanova, Placier, & Guilfoyle, 1989). There was also difficulty in determining how efficacy was defined in some qualitative studies. Consequently qualitative studies were included only if teacher efficacy was a main theme (e.g., Rosenholtz, 1987) or if qualitative data were used in triangulation with quantitative results (e.g., Ashton, Webb & Doda, 1983).

Table 1 summarizes the surface features of the studies. In the instrument column "persTE" is personal teaching efficacy; "genTE" is general teaching efficacy, and "total teacher efficacy" refers to instruments which combined the two dimensions into a single measure. "Rand" refers to the two items (one for personal and for general teaching efficacy) developed for the Rand studies of school change (Armor et al., 1976); "Gibson & Dembo" refers to the instruments developed by Gibson and Dembo (1984) and "Riggs & Enochs" is the science adaptation of the Gibson & Dembo instruments by Riggs and Enochs (1990).

Four types of research design are shown in Table 1; none of these are true experiments. Type 1 consists of single group correlational studies; the most powerful procedure used in the study (i.e., the extent to which the findings are protected from the threat of multicollinearity) is shown in the table (correlation, regression or path analysis). Type 2 consists of non-equivalent group (i.e., procedures to establish the equivalence of groups were deficient), post-only designs; the dominant procedure for comparing groups (t-tests, anova, ancova, manova) is shown in the table. Type 3 is made up of single group, pre-post designs; the dominant procedure for comparing pre- and posttest groups is shown as in Type 2. The fourth type, qualitative studies, were rare.

In the research design column, the designs listed are those which produced findings relevant to this review; it does not include other research designs used to generate other findings. For example, Guskey (1982) is described as a correlational study because findings linking teacher efficacy to teachers' experience and their attributions were generated from a correlational matrix. Guskey subsequently conducted a two-way multivariate analysis of variance to investigate the impact of gender and panel (grades 1-8 versus 9-12) on attributions, but this design was not listed in Table 1 because it produced no findings relevant to teacher efficacy.

**Table 1 About Here**

Teacher efficacy researchers, unlike investigators of self-efficacy in other domains, have not used well-controlled experimental designs. One reason is that there has been high interest in the association of efficacy with variables that cannot be manipulated (such as gender) or which would require difficult longitudinal designs to manipulate (such as experience). Another reason is

that it is very difficult to increase teacher efficacy. For example, attempts to increase perceived teacher efficacy through innovative in-service or preservice training have had mixed results (as described below). Manipulating efficacy downward would likely be easier, but no researchers have done so, probably for ethical reasons. Part of the difficulty is that most researchers have treated teacher efficacy as a global orientation that cuts across grades, subjects, and tasks, rather than treating it as a highly task-specific variable that could be developed with a short training activity.

The consequence of the avoidance of experimental designs is that almost all the findings, however consistent across studies, are clouded by problems of causality. Although teacher efficacy researchers use the language of antecedents and consequences, the direction of influence can never be determined with assurance when the arguments are based on covariation alone. It is entirely possible that many of the correlations are reciprocal rather than unidirectional and undetected variables may mediate the relationships of interest. Theoretical arguments, as well as path analytic procedures, can be introduced to assign causality, but to the rigorous empiricist the claims have yet to be confirmed.

The literature review is organized around the variables in Figure 1. In the figure teacher efficacy is represented as an outcome of teachers' personal characteristics and the organizations in which they work. These antecedents of teacher efficacy will be reviewed first. The review will then address the effects of teacher efficacy on teachers and students.

**Figure 1 About Here**

**Antecedents of Teacher Efficacy**

Teacher Characteristics. Personal characteristics (gender, teacher training and experience, causal attributions) each have an impact on teacher efficacy. Females frequently report higher personal teaching efficacy than males. The finding is consistent for teachers in elementary schools (Anderson, Greene & Loewen, 1988; Lee, Buck & Midgley, 1992), in special education resource rooms (Coladarci & Breton, 1991), and in high schools (Raudenbush, Rowan & Cheong, 1992). There is also evidence that females have higher total teaching efficacy (Evans & Tribble, 1986; Greenwood, Olejnik & Parkay, 1990). Since no relationship between gender and general teaching efficacy has been reported it is likely that the impact of gender on total efficacy is entirely attributable to the personal teaching efficacy component of the total scale. The size of the correlations is invariably small (typically in .20's) and in several studies it does not reach statistical significance.

The reasons why female teachers feel more efficacious than males may be related to the cultural stereotype that teaching is a predominantly female occupation. Evidence in support of this view comes from the only study in conflict with the pattern of female teachers reporting higher efficacy. Riggs (1991) found that male teachers (preservice and experienced) had higher

efficacy beliefs than females when an instrument focused exclusively on personal confidence in teaching science was administered. The association of personal teaching efficacy with gender may have reversed in this study because science teaching is associated with men--relatively few women major in science (Kahle, 1985). There were no differences in outcome expectancies: both genders believed that good teaching could lead to science learning. A study exploring the mediating effect of gender preferences in subjects on the relationship between efficacy and gender would be helpful.

Several studies have found general teaching efficacy declines with experience. Beady and Hansell (1981) were concerned with identifying factors that predicted teachers' expectations that black students would complete high school or college, viewed here as a measure of general teaching efficacy because it relates to teacher expectations about the ability of schools to overcome the disadvantages of minority group membership. They found that experience in the profession correlated weakly with teacher expectations that their students would finish college ($r$ = -.12); only the large sample size
($N$ = 441) enabled the small correlation to be detected. But when experience was entered into a series of regression equations with other school and teacher variables it was a significant predictor of teacher expectations. The standardized betas ranged from -.13 to -.35; (the latter represented the negative effect of teaching experience on the college expectations of black and white teachers in low achieving black schools).

Dembo and Gibson (1985) reported that preservice teachers had the highest confidence in the ability of schools to overcome the disadvantages of children's homes and that general teaching efficacy declined with experience. The correlation was low ($r$ = -.23). Unfortunately the data on which this evidence is based are unpublished and the details provided by Dembo and Gibson (1985) are limited.

Hoy and Woolfolk (1990) conducted a pre-post comparative group design to observe the effects of student teaching on general (and personal) teaching efficacy. In this exemplary study there were three groups: education students who had no teaching experience, education students who were to have their practice teaching experience in the coming semester and non-education majors enrolled in a psychology course. The study found that the general teaching efficacy of subjects who experienced classroom teaching declined while that of the two control groups was unchanged. Hoy and Woolfolk suggested that the decline may have been the result of preservice teachers rationalizing their inability to control unruly pupils. Saklofske, Michayluk and Randhwa (1988) compared first year candidates in a concurrent program to subjects in later years. They found that high expectations about the power of education to overcome disadvantages of the home recorded on entry to the program declined after the first year. Hoy and Woolfolk (1993) extended the findings by examining a sample of experienced teachers (the mean was 14 years). They found

that general teaching efficacy declined with experience ($r$ = -.23). Similar findings were reported by Bandura (1993).

The utility of the final study (Brousseau, Book & Byers, 1988) to link general teaching efficacy to experience was weakened by the use of a nonstandard instrument that equated efficacy with teacher effort. Brousseau et al. conducted a series of orthogonal (Helmert) contrasts to find that teacher experience had a negative effect on general teaching efficacy, but only for the least experienced groups. Preservice teacher candidates with some teaching experience scored lower than preservice candidates with none; experienced teachers combined with preservice teachers who had practice taught also scored lower than those who had never taught. But there were no significant differences between those with up to ten years experience and those with more than ten years.

These findings suggest that the impact of experience on general teaching efficacy is relatively small and occurs in the earliest years of socialization into the profession. The decline in teacher optimism about what schools can do might be the result of teachers becoming more knowledgeable about student variability and appreciating that some students have serious problems that are not readily amenable to instruction. It might also be a self-enhancement mechanism used to attribute student failures to home factors beyond the control of teachers.

Even as general teaching efficacy declines, there is some evidence that personal teaching efficacy increases. Teachers' confidence about the effectiveness of their own efforts grows during preservice (Cannon, 1992; Housego, 1990; Hoy & Woolfolk, 1990) and in the first few years of teaching (Dembo & Gibson, 1985). This increased confidence could be the result of teachers recognizing that they are becoming more skillful in their craft. Simultaneously with teachers' growing appreciation of the difficulty of the job is the realization that they are becoming more capable of dealing with it. The link between teaching experience and personal teaching efficacy was further explored by Benz, Bradley, Alderman and Flowers (1992). They asked preservice and experienced teachers (enrolled in a graduate program) how effective they believed they would be in handling fifteen teaching situations requiring different types of skills. Although this study could be criticized for failing to adjust the alpha level to control for having multiple dependent variables, the findings are of interest: Personal teaching efficacy of student teachers was higher than those of experienced teachers with respect to motivating students, but was lower for planning and evaluating lessons, situations that called for a larger knowledge base. This finding lends support to the argument, derived from Bandura's theory of self-efficacy, that teacher efficacy generalizes poorly from one task to another. Other researchers (Hoy & Woolfolk, 1993; Rubeck & Enochs, 1991) have reported increases in personal teaching efficacy with experience ($r$ = .23 and .26 respectively) in mature teacher populations.



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The interaction of age with experience was explored by Chester (1991). He found that teachers who were older when they began their careers experienced greater increases in personal teaching efficacy in the first few months of teaching than teachers who were younger. Age had no impact on the perceived efficacy of experienced teachers who were exposed to a disruptive event, a change of school, that decreased efficacy. Chester also found that the disadvantage of age for younger teachers could be overcome if they had opportunities to collaborate with experienced peers.

The research on teacher certification and efficacy has been fairly consistent. Hoover-Dempsey, Bassler and Brissie (1987) found a slightly positive correlation ($r$ = .18) between teacher efficacy and highest degree in an all elementary teacher sample remarkable for its size ($N$ = 1003). The size of the correlation may have been constrained by the restricted range of grades of the teachers in the study (K-4). Hoy and Woolfolk (1993) found that educational level (graduate training) was a predictor of personal ($r$ = .21), but not general ($r$ = .05) teaching efficacy. Rubeck and Enochs (1991) discovered that university coursework relevant to future teaching (e.g., science courses with laboratory requirements) predicted subject-specific personal teaching efficacy. Moore & Esselman's (1992) findings were contrary to the pattern. They found that teachers who lacked an undergraduate degree had higher efficacy, but the finding was likely confounded with school panel, since non-degree teachers are more likely to be found in elementary schools.

Teacher efficacy is associated with causal attributions. The linkages have been investigated most extensively by Bruce Hall and associates. They provided teachers with a list of factors that might account for student outcomes; six were internal locus of control items and the remaining four or five items were external attributions. After identifying three high performing and three low performing students, teachers indicated the importance of each factor in explaining the performance of each of the two groups (successful and unsuccessful students). Hall, Burley, Villeme and Brockmeier (1992) found that when accounting for student success, preservice teachers who focused on features under the control of the teacher (such as student attention and interest) had higher personal teaching efficacy scores. They also found that those who were less likely to attribute student failure to peer influence had higher general teaching efficacy. Similar findings for a sample of experienced teachers were reported by Hall, Hines, Bacon and Koulianos (1992): Teachers with higher personal teaching efficacy attached more importance to teacher ability and characteristics of the program (factors within teachers' control) in explaining student success and, to a slightly lesser extent, student failure. Teachers with higher general teaching efficacy were also more likely to attribute student success to teacher factors. Other researchers have found that teachers with high personal teaching efficacy are more likely to attribute success or failure to their own actions (Brookhart & Loadman, 1993; Czerniak & Schriver-Waldon, 1991).

These findings are congruent with results from studies which investigated attributions. Teachers with an internal locus of control tend to score higher in total teacher efficacy (Ashton et al., 1983; Greenwood et al., 1990; Haury, 1989; Lucas, Ginns, Tulip & Watters, 1993; Parkay, Olejnik & Proller, 1988). Specifying the direction of these correlations between teaching efficacy and causal attributions is not easy. It seems reasonable that a willingness to take responsibility for one's actions is a necessary precondition to feeling confident about one's ability to perform those actions, but the relationship may be reciprocal. The findings are almost tautological in that the early conceptualization of teacher efficacy (e.g., Berman et al., 1977) came out of Rotter's (1966) work on locus of control.

Teacher beliefs about the nature of students are also linked to feelings of efficacy. Dweck and Leggatt (1988) distinguished between incremental theories of intelligence (the belief that ability can be increased) and entity theories (the belief that ability is immutable). Bandura (1993) argued that higher self-efficacy is associated with the former. Fletcher's (1990) re-analysis of data from the High School and Beyond study supported this view. Fletcher found that the teacher differences in perceived efficacy within a school were predicted by teacher beliefs about students' ability to learn. Teachers with higher perceived efficacy were more likely to support the belief that ability is an acquired attribute.

Other studies have found that teacher efficacy correlates positively with other personal characteristics such as teacher reasoning skills (Anderson et al., 1988), race (Beady & Hansell, 1981 found that blacks scored higher than whites), age (Coladarci & Breton, 1991), self-concept (Lucas et al., 1993), thinking styles (Cancro, 1992) and achievement as a high school student or undergraduate (Haury, 1989). None of these investigations have been replicated.

Summary. The findings from studies that examined personal antecedents of teacher efficacy are reasonably consistent. Gender matters. Although the correlations are not large, where there are gender differences, females express greater confidence than males in the impact of their own teaching, except in one school subject differentially preferred by males. There is evidence that teaching experience has an effect, especially in the earliest years: personal teaching efficacy increases and general teaching efficacy decreases with experience in the profession. There are also links between perceived efficacy and causal attributions. Teachers who attribute student success and failure to forces within their control are more likely to score higher on teacher efficacy measures.

Organizational Antecedents. The most widely investigated attribute is grade. Elementary teachers have consistently reported higher efficacy than high school teachers (Greenwood et al., 1990; Guskey, 1982; Parkay et al., 1988) and middle school teachers (Fuller & Izu, 1986; Lee et al., 1992; Midgley, Feldlaufer & Eccles, 1988). Parkay et al. (1988) is representative of studies producing this finding in that the discovery of a link between efficacy and school type was largely

peripheral to their main inquiry (which focused on stress and locus of control). They administered a battery of instruments, including the two Rand items which were summed to create a total teaching efficacy score, to teachers in elementary, middle and high schools; the elementary teachers reported higher levels of efficacy than the other two groups.

There are two competing explanations for the finding. The first concerns conditions of teacher work that follow from the size and organizational structure of schools. Midgley, Feldlaufer and Eccles (1989) suggested that middle schools and high schools tend to be large, impersonal organizations in which teachers see a great number of students for brief time periods on rotary timetables. These factors inhibit teachers from acquiring the knowledge of student needs essential to good teaching and may result in lowering beliefs about personal and general teacher efficacy. A counter explanation comes from the finding that higher efficacy scores of elementary teachers have been reported very early in teachers' careers. Evans and Tribble (1986) found evidence of it in a survey administered to students in the first two weeks of a teacher education program, suggesting that teacher efficacy might be a personal characteristic influencing choice of panel when entering the profession. It may also be confounded with gender: Females, who tend to have higher teacher efficacy than males, constitute a higher proportion of the work force in elementary than in middle and high schools.

There is evidence that teacher efficacy declines with increasing grade in the elementary panel. Anderson et al. (1988) selected a small sample of high and low efficacy teachers from a larger cohort. They found that the grade 3 teachers had higher general teaching efficacy than those in grade 6. Bandura (1993) briefly summarized data from research in progress that suggested a quadratic relationship between grade and efficacy in the elementary panel. Bandura reported that perceived efficacy is low for kindergarten teachers because students are unprepared for school. Efficacy increases in K-1 as children learn school routines and master tasks which are relatively easy. There is a decrease in grades 2-6 as academic demands increase and scholastic deficits accumulate.

Within high schools, only one study investigated the relationship between grade and efficacy. Raudenbush et al. (1992), unlike all other researchers in this area, used the class as unit of analysis to investigate differences in personal efficacy within teachers. They found that the grade of the class taught had a positive effect on efficacy. The difference between a sophomore and junior class, for example, was .13 standard deviations.

These limited findings are insufficient to reach definitive conclusions about the effect of grade on efficacy, but they raise the possibility that the effect might be different in the two panels. One speculative hypothesis is that more able teachers (who, as will be shown below, tend to have higher efficacy scores) may gravitate toward upper classes in high schools, reflecting the increased status of teaching in the senior years. Building principals might encourage this trend

since these teachers have the potential to "polish" the graduates. The other side of the speculative coin is that in the elementary panel the reverse might occur. Here the more able might assign themselves to the primary years where the potential for socializing children to the school and the visibility of student development (and hence the intrinsic rewards) appear to be greater.

The evidence regarding the association of efficacy with classroom characteristics is best displayed in two well-designed quantitative studies. The most extensive study, by Raudenbush et al. (1992), found that class characteristics predicted a substantial proportion of the variance in high school teachers' personal teaching efficacy. The most important class variables were the extent to which the teacher felt prepared to teach the class and the ability track of students in the class. Both variables were positively associated with higher teacher efficacy. The influence of the ability track variable declined as students became more engaged in academic tasks. (Smylie, 1988 also found that the concentration of low achieving pupils in a class had a negative effect on teacher efficacy.)

Similarly, Newmann, Rutter & Smith (1989) found that when organizational characteristics features were added to a regression equation containing personal antecedents, the proportion of variance in teacher efficacy scores that was explained tripled (from 15% to 48%), the impact of student ability was cut in half and the effect of race and urban location was virtually eliminated. Among these organizational characteristics, orderly behavior of students was one of the strongest predictors. Teachers who reported that student misbehavior and class cutting were having a disruptive effect on their classrooms obtained lower teacher efficacy scores. These findings suggest that the more difficult the instructional challenge is perceived to be, the less capable teachers felt in accomplishing it.

A third investigation, which contained a qualitative dimension, sheds further light on the influence of class characteristics on teacher efficacy. Ashton et al. (1983) interviewed teachers about the factors they believed contributed to their classroom effectiveness. The analysis indicated that student ability had a large positive impact on perceived teacher efficacy, although the effects were lower when teachers had heterogeneous rather than ability tracked classes. In interpreting these data Ashton et al. observed that some teachers defined efficacy exclusively in terms of cognitive outcomes whereas others were more concerned with students' social development. The investigators speculated that the latter teachers would likely be less threatened by low achievers, suggesting there were interactions among teacher expectations, student outcomes and class composition. Teacher responses also indicated that class size had a substantial impact on their perceived effectiveness; teachers felt they would be more likely to bring about student learning in small than in large classes. These findings are limited in that there is ample evidence of a gap between teacher self-reports and observed behavior (D'Onofrio, 1989; Hook & Rosenshine, 1979; Wubbels, Brekelmans & Hooymayers, 1992) and treated in isolation the study is

hardly convincing. But it is the only study of teacher efficacy that attempts to tap teachers' understanding of the classroom characteristics that influence expectations about their effectiveness and suggests fruitful lines for further inquiry into within-teacher antecedents to supplement the pioneering study of Raudenbush et al. (1992).

In contrast with Raudenbush et al.'s (1992) finding that higher class size was associated with higher efficacy, Hoover-Dempsey et al. (1987) found that class size correlated negatively, but very weakly ($r = -.13$, $N = 1003$), with teacher efficacy. The discrepancy might be attributable to sample differences. Raudenbush et al. explored efficacy in high schools in which there was a tendency for the smaller classes to be reserved for remedial students. Hoover-Dempsey et al. conducted their investigations in elementary schools; it may be that there were fewer segregated classes for pupils with special needs in the lower grades and greater integration into regular classes.

There is ample evidence of the effect of school characteristics. Teacher efficacy is higher in higher achieving schools (Beady & Hansell, 1981; Smylie, 1988): teachers who enjoy success feel successful. Teacher efficacy is higher in schools perceived to have well-behaved pupils (Fletcher, 1991) and in schools reporting lower stress (Greenwood et al., 1990; Hall, Burley, Villeme & Brockmeier, 1992). Brissie, Hoover-Dempsey, and Bassler (1988)[2] found that personal teaching efficacy was negatively associated with burnout. Teacher efficacy is also higher in schools with satisfied teachers, as measured by commitment to teaching (Evans & Tribble, 1986), willingness to stay in the profession (Glickman & Tamashiro, 1982), satisfaction with current role (Brissie et al., 1988; Coladarci & Breton, 1991; Guskey, 1988), and willingness to re-choose teaching as a career (Trentham, Silvern & Brogdon, 1985). In these studies conditions which increase the difficulty of the teacher's task, diminish teacher confidence in their ability to complete those tasks successfully.

The evidence linking school socio-economic status (SES) to perceived efficacy is mixed. Bandura (1993) reported findings from an unpublished path analysis in which low SES combined with high student turnover and absenteeism to create a pattern of low prior achievement which reduced teachers' feelings of efficacy. Rose and Medway (1981) found that grade 4 teachers in low SES schools scored higher on a personal efficacy measure based on teacher willingness to take responsibility for the success of students. There were no differences on a second measure based on willingness to take responsibility for student failures. Hoover-Dempsey et al., (1987, 1992) found that school SES was not related to teacher efficacy, although it did predict parents' perceptions of their efficacy.

The difficulty of bringing about learning can be assuaged by organizational actions, particularly actions that support a productive school culture. Rosenholtz (1989), in a path analysis involving a very large sample of elementary teachers, found that four variables under school

control had a direct effect on teacher efficacy: receiving positive feedback on teacher performance, collaboration with other teachers, parent involvement in the school and school wide coordination of student behavior. Other investigators have supported these findings, particularly the correlation of teacher efficacy with instructional coordination within the school. Ross (1992) found that teachers who interacted with peer coaches (from their own schools and with expert teachers from other schools) had higher general teaching efficacy. Miskel, McDonald and Bloom (1983) reported a similar pattern: Teachers who engaged in joint work, sharing important instructional decisions (such as lesson preparation) with other teachers or with learning disability specialists, had higher teacher efficacy. Hoover-Dempsey et al. (1987) found that teacher efficacy was higher among teachers who were more aware of the expectations of teachers in grades above and below them. Moore and Esselman (1992), Raudenbush et al. (1992) and Rosenholtz (1989) each found that curriculum coordination within the school was positively associated with teacher efficacy. Efforts of district staff to coordinate curriculum also contributed to enhanced teacher efficacy (Rubeck & Enochs, 1991).

Teacher collaboration might affect teacher efficacy in several ways. Since there is evidence (reviewed by Cousins, Ross, & Maynes, in press) that teacher effectiveness is higher in schools with heightened teacher collaboration, it may be that teachers feel more efficacious because mutual help giving has increased their ability to bring about learning. It may also be that higher collaboration facilitates the development of technical norms that individual teachers can use to reassure themselves about the quality of their work and sharpen their expectations about future performance. Collaboration might influence teachers' perceptions of how effective they are by developing and maintaining shared appraisals. Newmann et al. (1989) found that degree of consensus within a school about efficacy was the greatest predictor of individual teacher efficacy.

On the other hand, increased collaboration might, in some instances, reduce the confidence of some teachers if they received negative feedback on their performance from their peers (Smylie, 1988). This might explain why Ashton et al., (1983) (in the qualitative section of their research) found teacher efficacy to be greater in the low than in the high collaboration school they studied.

An argument can also be made that efficacy is an effect not a cause of collaboration. For example, Rosenholtz (1989) found evidence of a reciprocal relationship between collaboration and efficacy. Personal teacher efficacy may contribute to enhanced teacher collaboration by providing teachers with the belief that they have something worthwhile to give and furnishing some protection from negative feedback. General teaching efficacy may augment staff cohesiveness by providing teachers with the belief that improving the instructional strategies used in the school can overcome the pernicious effects of out of school forces. The problem of determining the direction of causality is a persistent theme in the teacher efficacy literature. It follows from the

research designs that have been used and can be remedied only by well-designed interventions to promote perceived efficacy by enhancing collaboration among teachers.

Principals have the opportunity to modify teachers' perceptions of their efficacy by contributing to the information sources on which efficacy beliefs are based. By coordinating, supervising, and rewarding teachers principals can influence teachers' appraisals of their performance, heighten the exchange of vicarious experience, and engage in verbal persuasion. Principals can also enhance the physiological responses of teachers by protecting them from intrusions into instructional time (Lubbers, 1990). There is evidence that this is the case.

Leadership actions contributing to teacher efficacy include emphasizing accomplishment (Lee et al., 1992; Rosenholtz, 1989), increasing teachers' certainty about the worth of their practice (Smylie, 1988), involving teachers in school decision making (Berman et al., 1977; Fletcher, 1990; Moore & Esselman, 1992; Raudenbush et al., 1992), being responsive to teacher concerns (Brissie et al., 1988; Hoy & Woolfolk, 1993; Newmann et al., 1989), promoting an academic emphasis in the school (Hoy & Woolfolk, 1993), and providing supervision perceived to be useful by teachers (Brissie et al., 1988; Coladarci & Breton, 1991; Lubbers, 1990; Rees, 1986). The relationships between perceived teacher efficacy and leadership behavior are especially strong when individual efficacy is aggregated to the school level (Lubbers, 1990). All of these leadership factors tend to promote teacher professionalism and are associated with effective schools. These findings suggest that increased teacher efficacy might be an important intermediary outcome of school reform efforts. Intervention studies will be required to determine whether these organizational variables contribute to increased teacher efficacy and, if they do, whether it is by changing existing staff or by attracting different teachers to the school.

Rosenholtz (1987), in a qualitative analysis, assessed the impact on teachers' perceived efficacy of two state-wide schemes to improve the quality of the teaching profession. A minimum competency testing program had the effect of reducing teachers' autonomy because they felt they had to cut important topics from the curriculum and adopt a pace that was inappropriate for the needs of their students. The tests demanded high levels of teacher time that decreased teacher's performance efficacy because it reduced teacher-student interaction time. The testing program also increased the tendency of some teachers to attribute student failures to external forces beyond their control. These external attributions led to collegial interactions that encouraged teachers to give up. In contrast to these negative effects, the testing program had a positive impact on the perceived efficacy of a relatively small group of teachers who had classes similar to those of the developers and who shared the curriculum conceptions of state organizers. For these teachers the curriculum pacing required by the materials was appropriate--most students were at grade level and there was little heterogeneity--thereby increasing the teachers' feelings of success.

Rosenholtz found that a career ladder scheme impacted on teachers' perceptions of their efficacy in different ways, depending upon how the scheme was implemented. There was a positive effect when teachers were involved in setting the criteria for promotion and implementing the scheme, when the in-service needs were defined by teachers, and when the criteria for advancement included collegial leadership. In another setting the career ladder plan had negative effects: teachers were excluded from setting evaluation standards and poor teachers were promoted because it was possible to fake the classroom observations. A sense of injustice prevailed that reduced effort. Further decreases in perceived efficacy occurred when teachers were given little feedback by the evaluators and when teachers concluded that the portfolio method of assessment was unrelated to actual teacher performance. Sharing among teachers also declined because the material in the portfolios had to be original.

The results of attempts to change teacher efficacy have been mixed. Stein and Wang (1988) observed changes in teacher efficacy corresponding to the implementation of a specific innovation in a small sample ($N$ = 14 teachers) over three school terms. Changes in teacher practice occurred between terms one and two, preceding changes in teacher efficacy that developed between terms two and three. These data were used to argue that achievement in the new teaching task fostered positive perceptions of teachers' professional competence. Ross (in press) measured teacher efficacy on three occasions during a cooperative learning in-service extending over six months. Teacher efficacy scores were highly stable. The correlations between test administrations ranged from .61-.67 for personal teaching efficacy to .55-.81 for general teaching efficacy. There was a slight upward trend over the three occasions, but the differences did not reach statistical significance. Teachers who participated more extensively in the in-service (e.g., who reported they were more persistent in their attempts to implement cooperative learning techniques in their classrooms) showed higher increases in general teaching efficacy (particularly during the first phase of the in-service) than those who participated to a lesser degree.

Dutton (1990) examined the impact of an in-service to promote the use of cooperative learning techniques on personal teaching efficacy. She found that teachers who had gone through the professional development program had greater confidence in their teaching abilities than those who had not had the experience. Dutton also found that certain variables in the in-service (the provision of group sharing and problem solving during training) and variations in school follow-up to it (opportunities for discussion with colleagues, principal observation and feedback) were each associated with increased efficacy. But no data were presented to indicate that the groups were equivalent prior to the in-service (it appeared that volunteers were compared to non-volunteers), the teacher efficacy measure was unique to the study, the response rate varied

considerably from school to school, and the investigator inflated Type I error by using a series of one-way anovas.

Two studies investigated the impact of an in-service program based on the Madeline Hunter model. Bolinger (1988) found that personal teaching efficacy increased because the training program provided teachers with effective teaching skills that increased their performance, thereby contributing to teachers' confidence in their personal teaching abilities. General teacher efficacy was unaffected because the in-service made no attempt to influence teachers' outcome expectancies. But the credibility of Bolinger's findings was weakened by the absence of a control group, the failure to report the duration of the in-service and testing periods, and by the use of change scores in a one-way analysis of variance rather than a more powerful processing technique. Corbitt (1989) traced the impact of a six-week Hunter program on nine resource teachers. There was no overall impact of the program on personal or general teacher efficacy. Some teachers changed; others did not. The response depended on the fit of the model with teacher's preferred teaching practices.

Ohmart (1992) examined the impact of an in-service program specifically designed to increase teacher efficacy. The five day program (offered in two blocks separated by two weeks) consisted of activities intended to revise teachers' theories of intelligence (toward an incremental view) and between-session activities in which teachers used Hunter's strategies to improve the performance of one low ability child. The program had an immediate positive impact on participants' perceived efficacy (both personal and general), but the effect disappeared on the delayed posttest. The study suffered from severe sample attrition in the treatment group, the procedures for assigning teachers to treatment and control conditions were not described, and there was evidence that the control group was contaminated.

Finally, three studies attempted to enhance preservice teacher education by modifying the preservice program. Guyton, Fox, and Sisk (1991) found that an eight-week summer residency program followed by a one-year supervised internship was no more effective than a traditional preservice. The study was flawed by pre-existing differences between the treatment and control groups (the treatment group had a higher proportion of blacks and reported lower levels of parental support in the schools) and by the failure to administer an efficacy measure prior to the beginning of the programs. Volkman, Scheffler, and Dana (1992) were more successful. They found that a small sample of preservice teachers had higher end of the year teacher efficacy scores, controlling for pretest scores, than a control group who experienced traditional preservice. The treatment consisted of being assigned to a school that had a graduate assistant who conferred with the teacher after each lesson and provided biweekly meetings to discuss problems and solutions. The Volkman et al. study obtained a promising outcome, but the account of the investigation was brief, omitting such details as the duration of the treatment and the procedure

for assigning subjects to conditions. Vitale & Romance (1992) were less successful in a semester long videodisc program intended to increase preservice teachers' concept knowledge and attitudes toward teaching science. There was evidence of improved understanding and more positive attitudes, but on the teacher efficacy variable, confidence in ability to teach science to elementary students, there were no significant differences between treatment and control groups. Non-random assignment of subjects to groups weakened the credibility of the findings.

There are several reasons why the interventions had such mixed results. The first is the use of flawed designs to evaluate their impact--none were true experiments. Second, is the use of limited treatments. Most of the in-service interventions were relatively brief, had a limited number of sessions, and provided little in-school support (in the form of peer coaching or principal supervision). Third, the interventions did not confront the cognitive underpinnings of teachers' expectancies. Only one treatment (Ohmart, 1992) attempted to deal with teachers' conceptions of ability, their own and those of their students, or deal with teachers' attributions. But the intervention evaluated by Ohmart relied upon lecture and persuasion to influence teachers' conceptions and Bandura, Adams, and Beyer (1977) found that verbal persuasion was the weakest source of information influencing self-efficacy. Changing teacher efficacy may require a radical restructuring (Vosniadou & Brewer, 1987) in conceptions about students, teachers, and learning, comparable to the paradigm shifts in core conceptions held by students about science (Strike & Posner, 1992). Fourth, experienced teachers' beliefs about their efficacy may not be alterable through in-service. Although there is evidence of associations between efficacy and variables which are under school control (such as leadership), no studies have observed how these positive changes occur. Chester (1991) found that moving to a new school negatively affected experienced teachers' perceived efficacy and Rosenholtz (1987) observed the negative effects of school reform. It may be that something equally dramatic would be required to positively affect teacher efficacy.

Summary. Research conducted to date provides substantial evidence that organizational variables impact on teachers' expectations. There is consistent evidence that grade makes a difference: teacher efficacy is higher in elementary than in middle and high schools. The relationships among efficacy, grade and type of school (elementary/high school) appear to be complex and are currently unresolved. Classroom characteristics are salient: Teacher efficacy is higher in classes which teachers feel prepared to teach and which contain students who are relatively orderly and of higher ability. The results for class size are mixed. The findings concerning school variables are more consistent. There is abundant evidence that teacher efficacy is higher in schools characterized by low stress, a student population that achieves the school's learning goals, and a faculty of satisfied teachers. Organizational actions can have an effect. There is evidence that a collaborative culture and leadership responsive to teacher needs contributes to higher efficacy, but attempts to bolster teacher efficacy have had mixed results.

**Consequences of Teacher Efficacy**

Teacher Outcomes. Teachers with high efficacy beliefs are more likely to use instructional strategies which are powerful, but difficult to acquire, such as small group techniques (Tracs & Gibson, 1986), cooperative learning (Dutton, 1990) and activity based methods (Czerniak & Schriver-Waldon, 1991; Riggs & Enochs, 1990). These teachers are less likely to rely on approaches such as whole class teaching (Ashton & Webb, 1986; Tracs & Gibson, 1986) which are weaker, but easier to adopt.

All of these findings are correlational. For example, Tracs and Gibson (1986) administered a standard teacher efficacy measure (Gibson & Dembo, 1984) to a small sample of grade 4-6 teachers in two schools; each teacher was then observed for nine hours using a teacher time allocation scheme (Good & Brophy, 1973). The investigators found significant correlations between personal teaching efficacy and teachers' time allocations ($r = .42$, $N = 14$, $p<.03$ with use of small group instruction;
$r = -.52$, $N = 14$, $p<.03$ with use of whole class teaching). In these studies the direction of causality is ambiguous. Although the researchers reported that teacher practice was an outcome of efficacy (teachers with higher expectations attempted more challenging techniques), the opposite argument can be made. The mastery of more powerful teaching techniques could elevate teacher expectations about their effectiveness.

There is an additional problem in that some of the findings are based exclusively on self-reports. Starko and Schack (1989) found that perceived efficacy correlated (in the .37 to .60 range) with self-reported use of ten exemplary strategies for teaching gifted and talented learners. Bender and Ukeje (1989) produced similar results linking self-reported use of exemplary strategies for teaching mildly handicapped students in mainstreamed classrooms to efficacy. Vitali (1993) found that personal teaching efficacy positively predicted self-reported use of performance-based assessment and negatively predicted use of objective tests. There is a risk that in these self-reports teachers may be over-reporting use of strategies which are perceived to be desirable and there is no way of telling if they are using them correctly.

One of the most frequently replicated findings is that teachers with higher teaching efficacy are more willing and likely to implement new instructional programs. Guskey (1988) found that high efficacy teachers had more positive attitudes toward curriculum implementation. They viewed mastery learning as more important, more congruent with their present practice and less difficult to implement than did low efficacy teachers. Moore (1990) found that teachers with higher total efficacy scores were more likely to enroll in an intensive in-service program offering innovative science teaching strategies. Rose and Medway (1981) found the personal teaching efficacy predicted math instruction practices, such as the number of non-volunteers chosen to give answers. The more effective practices were associated with higher efficacy, although this

study failed to guard against Type I error when calculating multiple correlations. Similar results were reported by Berman et al. (1977). These findings suggest that feelings of efficacy provide teachers with the confidence to take the risk of learning difficult professional procedures and to persist with them through the implementation dip.

There is some controversy regarding the direction of causality; it is not obvious whether a willingness to innovate is an antecedent or consequence of teacher efficacy. Smylie (1988) found that general teaching efficacy was the strongest predictor of teacher use of innovative practices introduced in a fifteen-hour staff development workshop series. Each class was observed on three occasions before and after the in-service. Teachers with higher efficacy scores were more likely to introduce interactive teaching methods (recommended in the workshops) into their pedagogy. Smylie's study measured teacher efficacy on a single occasion. In contrast to this claim about the effects of efficacy on instructional practice, Stein and Wang (1988) presented evidence that teacher efficacy was the result of the acquisition of new teaching strategies. In their study efficacy and teacher practice were measured on several instances over the course of a year long implementation of a program to mainstream special needs children. They found that mean changes in teacher practice (for the whole sample) preceded changes in mean teacher efficacy. Further analysis indicated that the "star" implementors (those who had the highest degree of implementation) showed the greatest increase in efficacy; teachers who changed the least experienced an actual decline in efficacy. The difficulty with this study is its very small sample; there were only 14 teachers in the total sample and there were only three teachers in each of the star and low implementor categories.

The relationship between teacher efficacy and innovative practice may be affected by teacher interactions with their peers. Poole and Okeafor (1989) found that general teaching efficacy did not directly correlate with teacher implementation of new subject guidelines (based on self-report interviews). Teacher collaboration was an intervening factor. Higher teacher efficacy was associated with higher implementation only when there was substantial collaboration with other teachers concerning teacher decisions about the use of the new guidelines. The finding suggests that teachers who were convinced that good teaching could make a difference tried harder. Poole, Okeafor and Sloan (1989) reported different findings for personal teaching efficacy. There was an overall relationship: implementation increased as efficacy increased. But when collaboration was introduced as a covariate the relationship diverged. For high efficacy teachers there was higher implementation when there was less collaboration; for low efficacy teachers there was higher implementation when there was more collaboration. These findings suggest that teacher isolation magnified extremes: teachers with confidence in their own ability to bring about learning forged ahead while the less confident resisted the change. Collaboration with

other teachers may have had the effect of averaging implementation; it stimulated the laggards and restrained the early adopters.

Willingness to take responsibility for students with special learning needs has been linked to teacher efficacy. High efficacy teachers are more willing to develop programs for special pupils, rather than referring these cases to special services (Meijer & Foster, 1988; Podell & Soodak, 1993; Soodak & Podell, 1993a; 1993b). Soodak and Podell (1993a) found that the impact of efficacy on regular class placements was mediated by students' social class. For low socio-economic students, teachers with high personal efficacy were more likely to consider a regular class placement as appropriate for special needs students. But for high SES students there was no relationship. These results provide further evidence that high efficacy is an enabling factor increasing teachers' acceptance of difficult instructional challenges. However the findings on teacher willingness to take responsibility for special students in regular classrooms are based on teacher responses to hypothetical case studies in which teachers made referral decisions on the basis of very limited information. In some instances teachers were making judgments about age groups with which they were not familiar.

Teacher efficacy is related to other dimensions of good teaching. For example, teachers with higher confidence in their abilities are more likely to involve parents in school conferences, volunteering, and home monitoring (Hoover-Dempsey et al., 1987, 1992), suggesting that they feel less threatened by parental feedback and that they believe that the potentially negative effects of the home can be overcome by enlisting parental support. Higher efficacy is also associated with more positive attitudes toward the subject. Rubeck and Enochs (1991) found that personal teaching efficacy in chemistry was positively correlated with feeling comfortable with chemicals and believing that the effort to teach chemistry was worthwhile. Schriver (1993) found that higher efficacy was associated with knowledge of developmentally appropriate curricula.

Given the robust correlations between teaching efficacy and effective teaching practice, it is not surprising that teachers who score higher on teacher efficacy measures are given higher ratings by their supervisors. Trentham et al. (1985) asked superintendents to nominate teachers in three categories--superior, average, and low. These teachers were surveyed regarding perceptions of their competence as teachers. They found that efficacy was a significant predictor of superintendent appraisals. A similar pattern has been reported for principal ratings (Hoover-Dempsey et al., 1987; Riggs & Enochs, 1990). Personal efficacy also correlates with ratings of preservice teachers by university faculty (Flowers, 1988; Saklofske et al., 1988).

Personal teaching efficacy has been consistently linked to pupil control ideology, particularly in preservice training. Teachers with high personal teaching efficacy tend to promote student autonomy (Midgley et al., 1988), are more likely to confront student management problems than to respond permissively (Korevaar, 1990) and are more successful at keeping

students on task (Ashton et al., 1983). Those with high general teaching efficacy have more confidence in their classroom management techniques and rate management problems as less severe (Czerniak & Schriver-Waldon, 1991; Payne, Ford & Wisenbaker, 1992). They are more humanistic in their orientations and are less reliant on custodial methods to control the class (Ashton & Webb, 1986; Woolfolk & Hoy, 1990; Woolfolk, Rosoff & Hoy, 1990). These findings suggest that support for developmental approaches to student management requires a belief in the malleability of student behavior that may be bolstered by teacher expectancies.

Previous investigators have demonstrated that schools develop a prevailing ethos, a shared set of norms and understandings about purposes, that influences teacher and student outcomes (see, for example, Brookover, Beady, Flood, Schweitzer, & Wisenbaker, 1979). There is some evidence to suggest that teacher efficacy might contribute to the development of school cohesion. When Fuller and Izu (1986) surveyed a large sample of elementary teachers to determine what internal and external factors might account for teacher belief convergence, they found that teacher efficacy was a significant predictor. Schools with higher teacher efficacy scores were more likely to share positions on issues regarding school wide planning, school improvement ideology and the integration of personal and school philosophies.

Summary. Past research on the consequences of teacher efficacy reveals strong links with practice. Higher efficacy is associated with the use of teaching techniques which are more challenging and difficult, with teachers' willingness to implement innovative programs and with humanistic classroom management practices. The adoption of more effective teaching strategies is reflected in higher rankings by supervisors. There is also evidence to suggest that teacher efficacy contributes to the building of school consensus. Each of these findings suggests that higher teacher efficacy is associated with current conceptions of better teaching practice. Despite the consistency in the findings it is not clear that efficacy influences effectiveness rather than the reverse.

Student Outcomes. Higher teacher efficacy is associated with higher student cognitive achievement. It is important to note that in all of the studies below the investigators introduced procedures for controlling for entry ability since there is evidence (reviewed by Midgley et al, 1989) that teachers with low perceived efficacy are likely to be assigned lower achieving classes. Personal teaching efficacy contributes to student achievement in curriculum domains involving language such as reading, language arts and social studies (Anderson et al., 1988; Ashton & Webb, 1986; Ross, 1992; Tracs & Gibson, 1986; Watson, 1991). In contrast, general teaching efficacy contributes to student achievement in math (Ashton & Webb, 1986; Moore & Esselman, 1992; Ross & Cousins, 1993; Watson, 1991). One possible explanation for the interaction of efficacy type with subject achievement might be that many teachers view math as a talent that is given and see language as a set of skills that can be acquired. The extent to which teachers believe that natural

endowments can be overcome by education (general teaching efficacy) would thus play a larger role in math and the belief that individual teachers are able to develop student skills (personal teaching efficacy) would come to the fore in language. Combining personal and general teacher efficacy into a single construct produced mixed results: Rosenholtz (1989) found that total teacher efficacy predicted math and reading in grade 4, but not in grade 2. Armor et al. (1976) found it predicted large and consistent gains in reading achievement beginning in grade 6.

There is considerable evidence that teaching efficacy is linked to students' affective growth. The range of outcomes addressed has been broader than in the cognitive domain, but the findings are consistent: higher teacher efficacy contributes to higher student affect. For example, higher teacher efficacy is associated with enhanced student motivation (Ashton & Webb, 1986; Midgley et al., 1989; Roeser, Arbreton & Anderman, 1993), increased self-esteem (Borton, 1991), improved self-direction (Rose & Medway, 1981) and more positive attitudes toward school (Miskel et al., 1983). In all of these studies teaching efficacy and student outcomes were measured on a single occasion, raising the possibility of reverse correlation. The investigation of Midgley et al. (1989) is a persuasive exception. They measured changes in the beliefs of students ($\underline{N}$ = 1329) as they made the transition from grade 6 to grade 7. They then correlated these changes with the teaching efficacy scores of their pre- and post-transition teachers. The researchers found that grade 6 students with high efficacy teachers believed that they would do well. Students who then moved to classrooms taught by grade 7 teachers with lower efficacy beliefs reduced their expectations about future performance and their beliefs about how well they were currently performing. These findings were especially strong for lower achieving pupils. Further corroboration was provided by Ross (in press) who found that changes in student attitudes toward giving and seeking help to peers were greater in classrooms taught by teachers whose perceived efficacy increased over the duration of an in-service program.

Teacher efficacy might impact on student achievement in several ways. First, teachers with higher efficacy are more willing to learn about and implement new teaching techniques, particularly those methods which are especially demanding. These teachers may be more successful because they are using more powerful teaching strategies. Feelings of professional efficacy might produce a "generative capability" (Raudenbush et al., 1992) that enables teachers to construct new teaching strategies.

Second, higher efficacy teachers use classroom management approaches that stimulate student autonomy and reduce custodial control. Student achievement might be higher because these management strategies are more effective in keeping students on task (Woolfolk et al., 1990).

Third, higher efficacy teachers may be more successful because they attend to the needs of lower ability students more closely. Ashton et al. (1983) found that low efficacy teachers concentrated their efforts on the upper ability group, giving less regard to lower ability students

who were viewed as potential sources of disruption. In contrast, high efficacy teachers had positive attitudes toward low achievers, built friendly relationships with them and set higher academic standards for this group than low efficacy teachers did. Midgley et al. (1989) found that teacher efficacy had a bigger impact on low than high achievers, suggesting that lower ability students are less certain about their competence and hence more likely to be influenced by teacher expectations.

Fourth, teacher efficacy may lead to specific changes in teacher behavior which creates changes in students' perceptions of their academic abilities. As student efficacy becomes stronger students may become more enthusiastic about school work and more willing to initiate contacts with the teacher, processes that impact directly on achievement (Ashton et al., 1983; Ashton & Webb, 1986). Evidence that teacher efficacy has a delayed impact on student achievement (Midgley et al., 1989 found that teacher efficacy correlated with achievement in the spring, but not the fall) is congruent with this view.

Fifth, it may be that teacher efficacy influences student achievement through teachers' goals, although this issue has not been investigated with samples of experienced teachers. Brookhart and Loadman (1993) found that teachers beginning their careers with high confidence in their ability to perform various teaching functions were more likely to report that their reason for teaching content was to foster student development. In contrast, low confidence teachers believed that the purpose of teaching was to cover the curriculum. Similarly, the small sample of high efficacy teachers in Czerniak and Schriver-Waldon's (1991) qualitative study found that preservice candidates with high personal efficacy chose instructional strategies based on their power to increase student learning, while the low efficacy candidates selected methods in terms of their potential to reduce noise and confusion.

Finally, teacher efficacy may influence student achievement through teacher persistence. Teachers with high perceived efficacy may view student failure as an incentive to greater teacher effort rather than conclude that the causes of failure are beyond teacher control and cannot be reduced by teacher action.

Summary. The findings about the impact of teacher efficacy on achievement are consistent. Higher teacher efficacy enhances student mastery of cognitive and affective goals.

**Deficiencies of Past Research**

Previous studies of teacher efficacy have made substantial progress in identifying its antecedents and consequences, but there are several problems with the research that has been conducted to date. First, many researchers (e.g., Dutton, 1990; Evans & Tribble, 1986; Fletcher, 1990; Gorrell & Capron, 1990; Housego, 1990; Hoover-Dempsey et al., 1987; Moore, 1990; Trentham et al., 1985; Tuetteman & Punch, 1992) have treated teacher efficacy as a unidimensional trait. Yet the research evidence indicates that the distinction between personal

and general efficacy is a meaningful one. Even though some studies have found a weak positive correlation between the two (e.g., $r = .23$ in Ross, 1992), there are important differences in their antecedents and consequences. In addition, the arguments used to explain the relationships between teacher efficacy and other variables depend upon the specific dimension of teacher efficacy addressed.

Second, a variety of measures of teacher efficacy have been used, each suggesting a particular definition of teacher efficacy. Three measures (Rand, Gibson & Dembo, Riggs & Enochs), and their variants, predominate. Beyond these instruments, other measures, often unique to a single study, have been produced. Personal teaching efficacy has been measured with items in which teachers rated their performance in archetypal teaching situations (Benz, et al., 1992), reported how responsible they felt for student success and failure (Guskey, 1988; Rose & Medway, 1981), how able they felt teaching slow learners (Gorrell & Capron, 1990), how influential they were with students (Korevaar, 1990), and how prepared they felt they were to teach (Brookhart & Loadman, 1993; Housego, 1990, 1992). Other instruments have been constructed to focus on specific innovations (Stein & Wang, 1988), subjects (Haury, 1989; Moore, 1990), the relationship between effort and outcome in teaching (Miskel, McDonald & Bloom, 1983), beliefs about teaching and learning (Hoover-Dempsey et al., 1987; Trentham et al., 1985) or predictions of the likelihood that specific student groups would complete college or high school (Beady & Hansell, 1981). The variety of measures suggests that individual studies may be sampling different dimensions of teacher efficacy and that some between-study comparisons may be inappropriate.

Third, researchers have focused on between-teacher issues to the neglect of within-teacher questions. Among the most important of the latter is the problem of the stability of the construct. A large proportion of the studies have measured efficacy on a single occasion, assuming that it is a stable trait. Yet there is growing evidence that teachers' perceptions of their own effectiveness and that of the profession as a whole vary over time. The few developmental studies of teacher efficacy that have been conducted have been set in preservice teacher education programs, focusing on the effects of the practice teaching experience on teacher confidence (e.g., Housego, 1990, 1992; Hoy & Woolfolk, 1990). In contrast with this period of rapid change, the feelings of professional competence of experienced teachers may be more stable (Anderson et al., 1988; Moore & Esselman, 1992).

Fourth, in Bandura's (1977) original theory of self-efficacy, the strength of an individual's feelings of competence differed among domains and varied with the level of task difficulty within domains. But much of the research on teacher efficacy generalizes across contexts without testing whether it is appropriate to do so. Although there is some evidence that some of the most frequently used measures (e.g., Gibson & Dembo, 1984) do test responses across a range of

situations, in virtually all reported studies the aggregated scores rather than the individual items/situations were used. Benz et al. (1992) appraised teacher beliefs about their ability to perform fifteen teaching tasks, but their between-group comparisons failed to make Bonferroni adjustments of the alpha for multiple dependent variables and used a procedure (Student-Neuman-Keuls) that is not robust where there are unequal group sizes. In contrast, Raudenbush et al. (1992), the only investigator to examine within- and between-individual differences in the same time frame, found that within-individual differences accounted for 44% of the variance in personal teaching efficacy scores. Ashton et al. (1983) also observed that teacher efficacy varied within individuals according to the instructional context, although their findings were based on a much smaller sample.

Fifth, despite the evidence that teacher efficacy is strongly associated, theoretically and empirically, with important student and teacher outcomes, to date there have been relatively few interventions to strengthen teachers' feeling of personal competence and their beliefs in the propitious power of education. The results of the quasi-experiments to be reported have been mixed. In the absence of such research, current claims about the antecedents of teacher efficacy are weakened by uncertainty about the direction of correlational findings. For example, although most researchers treat stress as an antecedent of efficacy, Tuettemann & Punch (1992) argued from correlational evidence that teacher efficacy reduced teacher stress levels.

**Priorities for Future Research on Teacher Efficacy**

Future studies of teacher efficacy should follow the best practices of previous investigators. For example, future researchers should treat the construct as a multi-dimensional entity rather than a singular trait, examining personal and general teaching efficacy separately rather than aggregating them. In the absence of a powerful rationale to the contrary, future researchers should measure teacher efficacy with the most frequently used instruments to facilitate comparisons between studies. Research designs requiring non-standard measures should describe how these relate to previous definitions of teacher efficacy.

Although a large number of research questions could be generated from Figure 1 (e.g., the impact of teacher efficacy on previously unexplored student outcomes such as attitudes predictive of school withdrawal [identified by Finn, 1989]), two areas of research are particularly timely. The first concerns the development of teacher efficacy over time. We know very little about how teacher efficacy relates to phases in teachers' careers (such as the stages described by Fuller, 1969; Kagan, 1992; Oja, 1989), whether there are growth spurts and, if so, when they occur and why. In the short run studies addressing career growth in efficacy might be cross-sectional to identify the cutting points when change typically occurs. Longitudinal tracking of individuals will be required to define these moments more precisely and to account for their occurrence. The latter

might benefit from a shift toward more qualitative approaches; previous research conducted under the rubric of teacher efficacy has been biased toward quantitative methods.

The second priority area concerns the use of the construct in school improvement research, beginning with studies that treat teacher efficacy as an intermediate teacher outcome, predictive of change in teacher practice. Although few intervention studies have been conducted, suggested strategies for stimulating teacher efficacy abound. For example, Ashton et al. (1983) proposed that the socialization of new teachers might provide an entry point; Newmann et al. (1989) submitted that teacher knowledge and coordination with colleagues' courses could be the vehicle; Raudenbush et al. (1992) suggested that increasing teacher collaboration and teacher control of decisions could be the key. These strategies for strengthening teacher efficacy need to be elaborated, operationalized and tested. Another promising area to be explored further is in-service focused on specific skills and knowledge or learning to teach activities that foster teacher reflection (Richardson, 1990a, 1990b). Given the consistent evidence of impact on valued student outcomes, administrators might choose to use teacher efficacy as a criterion in personnel selection. Studies examining such questions as whether teachers with higher initial scores integrate more smoothly into the role would be of theoretical and practical interest. Given the evidence of the relationship between beliefs about efficacy and desirable teacher practice, teacher efficacy measures might be used as dependent variables in studies of the effects of clinical supervision, induction, mentoring and peer coaching.

Research on teacher efficacy has provided a consistent set of findings that demonstrate the importance of the construct as a predictor of student and teacher outcomes. What is now required are studies that use this knowledge to design interventions to improve conditions in schools.

**Author References**

[1]Paper presented at the annual meeting of the Canadian Association for Curriculum Studies, Calgary, June 1994. The research was funded by the Ontario Ministry of Education of Training through a grant to the Ontario Institute for Studies in Education and by the Social Science and Humanities Research Council of Canada. The views expressed in the article do not necessarily represent the views of the Ministry or the Council.

[2]Brissie et al. (1988) used the same data set as Hoover-Dempsey et al. (1987).

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**Table 1 Studies of Teacher Efficacy**

| Study | Sample | Instrument | Research Design |
|---|---|---|---|
| Anderson, Greene & Loewen (1988) | 24 gr 3 & 6 teachers; 495 students | persTE & genTE: Gibson & Dembo | Type 3: regression |
| Armor et al. (1976) | 81 elementary teachers | total teacher efficacy: Rand | Type 1: regression |
| Ashton & Webb (1986) | 48 gr 9-11 teachers | persTE & genTE: Rand | Type 1: regression |
| Ashton, Webb & Doda (1983) | 97 middle & high school teachers | persTE & genTE: Rand | (a) Type 1: regression, (b) Qualitative |
| Beady & Hansell (1981) | 441 gr 4, 5 teachers | genTE: expectation students will finish high school & college (17 items) | Type 1: regression |
| Bender & Ukeje (1989) | 50 gr 3-12 teachers | persTE & genTE: Gibson & Dembo | Type 1: regression |
| Benz, Bradley, Alderman & Flowers (1992) | 38 teachers, 263 student teachers | persTE: 15 items rating self in teaching situations | Type 2: anova |
| Berman et al. (1977) | 1072 teachers | total teacher efficacy: Rand | Type 1: regression |
| Bolinger (1988) | 207 elementary & secondary | persTE & genTE: Gibson & Dembo | Type 2: anova |
| Borton (1991) | 3 gr 3/4 teachers, 79 students | persTE & genTE: Gibson & Dembo | Type 1: path analysis |
| Brookhart & Loadman (1993) | 289 preservice graduates | persTE: 12-22 items on teaching self-confidence | Type 2: chi square |
| Brousseau, Book, & Byers, (1988) | 773 preservice, 472 teachers | genTE: 7 items, unique to study | Type 2: manova |
| Cancro (1992) | 119 teachers | persTE & genTE: Gibson & Dembo | Type 1: regression |
| Cannon (1992) | 121 preservice teachers | persTE for science: Riggs & Enochs | Type 2: anova |
| Chester (1991) | (a) 5 novice teachers, (b) 173 new hires (56 novices) | (a) open ended interviews, (b) persTE: 14 items unique to study | (a) Qualitative, (b) Type 1: regression |

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|---|---|---|---|
| Coladarci & Breton (1991) | 378 special ed resource room teachers | persTE: adapted from Gibson & Dembo and Rand items | Type 1: regression |
| Corbitt (1989) | 9 resource room teachers | Open ended interviews | Qualitative |
| Czerniak & Schriver-Waldon (1991) | 16 preservice science teachers | persTE & genTE: Riggs & Enochs | Qualitative |
| Dembo & Gibson (1985) | preservice teachers (N not available) | persTE & genTE: Gibson & Dembo | Type 1: correlation |
| Dutton (1990) | 129 elementary teachers | total teacher efficacy: 15 items unique to study | Type 2: anova |
| Evans & Tribble (1986) | 59 preservice teachers | total teacher efficacy: Gibson & Dembo | Type 1: correlation |
| Fletcher (1990) | 6178 teachers (High School & Beyond Sample) | total teacher efficacy: 2 items unique to study | Type 1: Hierarchical linear modelling |
| Flowers (1988) | 101 preservice teachers | persTE: 15 vignettes | Type: regression |
| Fuller & Izu (1986) | 1305 elem, 351 secondary teachers | persTE: 2 items from Brookover et al. (1979) | Type 1: regression |
| Gibson & Dembo (1984) | (a) 208 elementary teachers, (b) 55 teachers in graduate course, (c) 4 high & 4 low efficacy teachers | persTE & genTE: Gibson & Dembo | (a) Type 1: factor analysis, (b) Type 1: correlation, (c) Type 2: t-test |
| Glickman & Tamashiro (1982) | 129 1st yr, 5th yr & former teachers | total teacher efficacy: Rand items | Type 2: anova |
| Gorrell & Capron (1990) | 93 low & moderate efficacy preservice teachers | total teacher efficacy: ability to teach slow learners (1 item) | Type 2: manova |
| Grafton (1987) | 306 teachers | total teacher efficacy: Gibson & Dembo | Type 1: cannonical correlation |
| Greenwood, Olejnik, & Parkay (1990) | 250 K-12 teachers in high & low stress schools | persTE & genTE: Rand items cross-multiplied to create 4 categories | Type 2: manova |

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|---|---|---|---|
| Guskey (1988) | 114 elem & second teachers | total teacher efficacy: Rand items and responsibility for student outcomes | Type 1: correlation |
| Guskey & Passaro (1993) | 59 preservice & 283 teachers | total teacher efficacy: Gibson & Dembo, Rand | Type 2: t-test |
| Guyton, Fox, & Sisk (1991) | 49 preservice teachers | persTE & genTE: Gibson & Dembo | Type 2: Mann-Whitney U |
| Hall, Burley, Villeme & Brockmeier (1992) | 300 preservice teachers | persTE & genTE: Gibson & Dembo | Type 1: canonical correlation |
| Hall, Hines, Bacon & Koulianos (1992) | 240 gr 1-12 teachers | persTE & genTE: Rand items | Type 2: manova |
| Haury (1989) | 104 preservice science teachers | total teacher efficacy: attitudes toward science teaching skills (30 items) | Type 1: regression |
| Hoover-Dempsey, Bassler & Brissie (1987) | 1003 K-4 teachers | persTE: 11 teacher belief items about teaching & learning | Type 1: regression |
| Hoover-Dempsey, Bassler & Brissie (1992) | 50 teachers, 390 parents | persTE: 11 teacher belief items about teaching & learning | Type 1: correlation |
| Housego (1990) | 83 preservice teachers | total teacher efficacy: preparedness to teach [43 items] | Type 3: anova |
| Housego (1992) | 177 secondary preservice teachers | total teacher efficacy: preparedness to teach [50 items]; persTE & genTE: Gibson & Dembo | Type 3: anova |
| Hoy & Woolfolk (1990) | 125 preservice teachers; 66 psychology students | persTE & genTE: Gibson & Dembo, Rand | Type 3: manova |
| Hoy & Woolfolk (1993) | 179 elementary teachers | persTE & genTE: Gibson & Dembo, Rand | Type 1: regression |
| Korevaar (1990) | 285 teachers | persTE: 20 items about ability to influence students and other teachers | Type 2: t-test |
| Lasserre (1989) | 69 schools (352 teachers) | persTE & genTE: Gibson & Dembo | Type 1: canonical correlation |

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|---|---|---|---|
| Lee, Buck & Midgley (1992) | 117 elem & middle school teachers | persTE: 6 items | Type 1: regression |
| Lubbers (1990) | 396 teachers | persTE & genTE: Gibson & Dembo | Type 1: regression |
| Lucas, Ginns, Tulip & Watters (1993) | 98 preservice teachers | persTE & GenTE for science: Riggs & Enochs | Type 1: correlation |
| Meijer & Foster (1988) | 230 gr 2 teachers | persTE: 11 items adapted from Gibson & Dembo | Type 2: mancova |
| Midgley, Feldlaufer & Eccles (1988) | 171 gr 6 & 7 teachers | persTE: 5 items including Rand 2 | Type 1: correlation |
| Midgley, Feldlaufer & Eccles (1989) | 101 gr 6/7 math teachers, 1329 students | persTE: 5 items including Rand 2 | Type 1: regression |
| Miskel, McDonald & Bloom (1983) | 1442 teachers & 890 students in 89 elem & sec schools | persTE: 3 items about the relationship between effort & outcome in teaching | Type 1: regression |
| Moore (1990) | 221 elementary teachers | total teacher efficacy: beliefs about teaching ability (25 items) | Type 3: anova |
| Moore & Esselman (1992) | 1802 elem, mid & high school teachers | persTE & genTE: Rand items & others | Type 3: manova |
| Newmann, Rutter & Smith (1989) | teachers in 353 high schools | persTE: 4 items unique to study | Type 1: regression |
| Ohmart (1992) | 144 teachers | persTE & genTE: Gibson & Dembo + Rand | Type 2: ancova |
| Parkay, Olejnik & Proller (1988) | 321 elem, mid & high school teachers | persTE, genTE and total teacher efficacy: Rand items | Type 2: anova |
| Payne, Ford & Wisenbaker (1992) | 44 preservice teachers | persTE, genTE: Gibson & Dembo + other items | Type 1: regression |
| Podell & Soodak (1993) | 240 teachers enrolled in graduate courses | persTE, genTE: Gibson & Dembo | Type 1: correlation |
| Poole & Okeafor (1989) | 125 K-gr 3 teachers | genTE: Gibson & Dembo | Type 2: ancova |
| Poole, Okeafor & Sloan (1989) | 140 K-gr 3 teachers | persTE: Gibson & Dembo | Type 2: ancova |

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| Raudenbush, Rowan & Cheong (1992) | 315 high school teachers | persTE: single item unique to study | Type 1: hierarchical linear modelling |
| Rees (1986) | 314 elementary teachers | persTE: 20 items unique to study | Type 1: canonical correlation |
| Riggs (1991) | 331 experienced & 210 preservice teachers | science persTE: Riggs & Enochs | Type 2: t-tests |
| Riggs & Enochs (1990) | 331 elementary teachers | science persTE: adaptation of Gibson & Dembo items | Type 1: correlation |
| Roeser, Arbreton & Alderman (1993) | 10 teachers, 273 gr 4-5 students | persTE: 5 items including Rand 2 | Type 1: hierarchical linear modelling |
| Rose & Medway (1981) | 45 gr 1-5 teachers; 30 female gr 4 teachers | persTE: responsibility for student outcomes (28 items) | Type 1: correlation |
| Rosenholtz (1987) | 73 elementary teachers | persTE: open ended interviews | Qualitative |
| Rosenholtz (1989) | 1213 elementary teachers & their students | total teacher efficacy: certainty about practice (11 items) | Type 1: path analysis |
| Rubeck & Enochs (1991) | 93 middle school science teachers | persTE, genTE for science & chemistry: Riggs & Enochs | Type 1: path analysis |
| Saklofske, Michayluk & Randhawa (1988) | study 1: 311 preservice teachers; study 2: 65 preservice teachers | persTE for science: Riggs & Enochs | Type 1: correlation |
| Schriver (1993) | 120 gr 7-8 teachers | persTE, genTE for science & chemistry: Riggs & Enochs | Type 1: regression |
| Smylie (1988) | 56 gr 1-12 teachers | persTE: 3 items including Rand 2 | Type 1: path analysis |
| Soodak & Podell (1993a), study 2 | 240 regular teachers | persTE, genTE: Gibson & Dembo | Type 1: regression |
| Soodak & Podell (1993b) | 192 regular & spec ed teachers | persTE, genTE: Gibson & Dembo | Type 1: canonical correlation |
| Starko & Schack (1989) | 176 preservice, 142 experienced teachers | persTE: 10 self-confidence items unique to study | Type 1: correlation |
| Stein & Wang (1988) | 14 K-gr 4 teachers | persTE: 22 items specific to innovation | Type 3: anova |

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|---|---|---|---|
| Tracs & Gibson (1986) | 14 gr 4-6 teachers | persTE & genTE: Gibson & Dembo | Type 1: regression |
| Trentham, Silvern & Brogdon (1985) | 153 superior, average & low teachers | totalTE: 10 items unique to study | Type 1: regression |
| Tuetteman & Punch (1992) | 574 secondary | total teacher efficacy: perceptions of general competence | Type 1: regression |
| Vitale & Romance (1992) | 74 female preservice teachers | total teacher efficacy: confidence in science teaching skills (4 items) | Type 3: mancova |
| Vitali (1993) | 117 teachers | total teacher efficacy: responsibility for student outcomes | Type 1: correlation |
| Volkman, Scheffler, & Dana (1992) | 24 elementary preservice teachers | total teacher efficacy: not described | Type 2: ancova |
| Watson (1991) | 250 gr 3 teachers | persTE & genTE: earlier version of Gibson & Dembo | Type 1: correlation |
| Woolfolk & Hoy (1990) | 182 preservice teachers | persTE & genTE: Gibson & Dembo | Type 1: regression |
| Woolfolk, Rosoff & Hoy (1990) | 55 gr 6/7 teachers | persTE & genTE: Gibson & Dembo + other items | Type 1: regression |
| Author (1992) | 18 gr 7/8 history teachers, 6 coaches | persTE & genTE: Gibson & Dembo | Type 1: regression |
| Author (1993) | 24 gr 9/10 teachers, 240 students | persTE & genTE: Gibson & Dembo | Type 2: ancova |
| Author (in press b) | 50 gr 7-9 teachers, 1228 students | persTE & genTE: Gibson & Dembo | Type 1: regression |

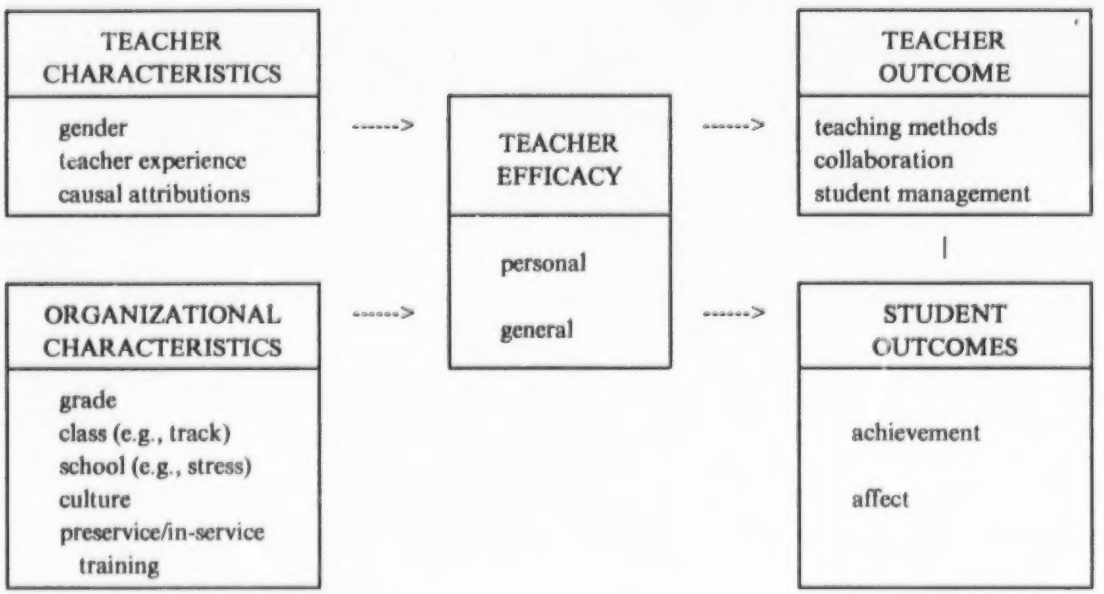


Figure 1: Antecedents and outcomes of teacher efficacy.